



Study on Aqua-entrepreneurship in *Litopenaeus vannamei* Culture in Raigad district of Maharashtra

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ABSTRACT

White leg shrimp (*Litopenaeus vannamei*) farming is getting faster attention and therefore, an investigation was carried out to study economics of *L. vannamei* culture carried out by a group of aqua-entrepreneurs. Information was collected from the farmer group through focused group discussion and the results revealed that, with initial investment through individual contribution started shrimp farming in 0.4 ha area. Initially this group faced some technical and management related problems due to unaware of scientific shrimp farming. After undergoing shrimp culture skill training, successfully doing shrimp farming and each group member now earning approximately net income Rs. 1.66lakh/yr. The study also revealed that this group has brought a significant improvement in socio-economic status of group members. It is suggested that potential farmers can come together and form groups and start group farming activity with the financial assistance from financial institutions.

Key Words: Aquaculture, Entrepreneurship, Economics, Group, *Litopenaeus vannamei*.

INTRODUCTION

The commercial success of introducing *L. vannamei* into Asia can be attributed to its superior aquaculture traits compared with *Penaeus monodon*, the most popular cultured Asian penaeid (Liao and Chien, 2011). Asian countries are the major producers of cultivable shrimps, which include China, Thailand, Vietnam, Indonesia, India, Bangladesh, Myanmar, etc. (Chowdhury, 2006). Demand for aquatic food is increasing day by day as the world population is increasing. Aquaculture of shellfishes and finfishes is an important farming component and recognized as an important means for livelihood, rural development, food and nutritional security (Ayyappan and Diwan, 2006). Among various fish production enterprises, shrimp aquaculture is one of the fastest growing forms of aquaculture. The world total cultured shrimp production is 3.3 million tons. In cultured shrimp production China rank first while India stands at

fifth position with production of 8.0 lakh tones (MPEDA, 2020).

Maharashtra is endowed with 70 creeks along 720 km of coastline. The total brackish water area available in Maharashtra is 52,001 ha, of which only 10400 ha is suitable for farming. At present area under shrimp farming in Maharashtra is 1,539 ha that is about 15.4% of the total suitable area. Six coastal districts of Maharashtra contribute significantly to the shrimp production of Maharashtra. Amongst them Raigad district contributes significantly in cultured shrimp production. Raigad district has 15 major creeks. Total available brackish water area for shrimp farming is 9608 ha. Out of which 3655 ha is found suitable for brackish water aquaculture.

Shrimps are called as the Pinkish Gold of the sea because of its universal appeal, unique taste, high unit value realisation and increasing demand in the world market. As per the policy of the Government

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of India Doubling Farmers Income coupled with Blue Revolution, shrimp culture has gained great importance and is contributing largely towards Blue Revolution in the country. In response to this appeal, many farmers in Raigad district have individually started shrimp farming enterprise. Shri Shankar Shetkari Gramasth Mandal, Janavali is the first fish farmers group in Raigad district, Maharashtra successfully doing shrimp (*Litopenaeus Vannamei*) culture. Therefore, study was undertaken to note down the economics of shrimp farming by group aqua-farmers in Raigad district of Maharashtra.

MATERIALS AND METHODS

Pond construction

Pond construction was carried out with the help of tractor having bund size of 6 m at bottom and 2 m at the top and height of the bund was 1.5 m. For complete draining of water from the pond, the pond bottom slope towards the sluice gate was maintained to 1 per cent. In addition to this, a pit having of 2 x 2 x 0.8 m. size was digged in the centre of the pond to remove sludge accumulated during culture operation.

Pre-stocking management

During high tide, water was taken in the pond screened through 300 micron mesh nets and filled to a level of 6 ft. Bleaching powder was applied @ 60 ppm in the pond water. After four days, fermented mixture slurry of Jaggery and rice bran was applied and subsequently after 2 days pond probiotics was applied in the pond water to enhance the plankton bloom.

Stocking of Post larvae

Specific pathogen free post larvae of *Litopenaeus vannamei* was procured from government recommended registered hatchery from Tamil Nadu and stocked at the rate of 20 numbers per m² in the pond after acclimatization with aeration and water exchange.

Feeding

Required amount of pelleted shrimp feed of

reputed multinational feed company was used. Feed was given at a pre-decided rate at thrice daily initially and there after four times daily rest of the culture duration.

Sampling during culture

After 30 days of culture period, weekly sampling was carried out to check growth, survival and influence of disease etc. Water exchange was done as per the requirement during the culture operation. Aeration was given to the pond throughout the culture period except during feeding hours.

RESULTS AND DISCUSSION

The data (Table 1) revealed that average capital cost incurred for 0.4 ha of shrimp farm was Rs. 5,15,000/- whereas variable cost incurred for was Rs. 3,20,900/- first crop while 3,99,300/- for second crop. The average weight reported was 25 g and 33 g for first and second crop, respectively. Average production was 1700 kg and 2200 kg per 0.4 ha/year for first and second crop, respectively. Average selling price was Rs 360/- and Rs 400 /-per kg. Net income to individual member in first year was Rs. 45,733/-. Net income to individual member from second year onwards was Rs 1,66,100/- from 0.4 ha farming area.

Study revealed that, average annual net income from group shrimp farming was Rs. 4,15,250/- yr/ha. Dona *et al* (2016) reported that annual income of shrimp farmers of Kerala was Rs. 2,00,000 per crop/per ha. Rajarajan (2017) reported annual net income of shrimp farmers of Tamil Nadu was Rs. 3,69,000/- per crop/per ha. Navghan *et al* (2015) reported annual net income of shrimp farmers from Navsari district, Gujarat was Rs. 16,15,000 per crop/per ha. Jagadeesh (2015) while studying economics of shrimp farmers from Andhra Pradesh adopting BMPs was Rs.12,60,000/crop/ha.

Per capita income of Maharashtra and India was Rs. 1,76,902/- and 1,14,958/-, respectively. The income levels of shrimp farmers showed that shrimp farmers of Raigad through group shrimp farming were earning higher income than the per

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Table1. Economics of *Litopenaeus vannamei* culture in 0.4 ha water spread area.

A) Fixed Capital			
Particulars of fixed capital		Amount (Rs.)	
1	Pond construction of 0.4 ha pond	50,000/-	
2	Sluice gate construction	1,50,000/-	
3	Aerators 4 numbers @ Rs. 25000/aerator	1,00,000/-	
4	Diesel generator 10 Hp (one)	75,000/-	
5	Pump one number	40,000/-	
6	Bird fencing, Miscellaneous	1,00,000/-	
Total (Rs.)		5,15,000/-	
B) Variable cost			
No.	Particulars	Amount Rs/Quantum/Units	
		First crop	Second crop
a)	Pond preparation		
1	Lime 250kg. @ Rs 4/kg.	1,000/-	1,000/-
2	Bleaching 240 kg @ 60ppm (@ Rs.25/kg)	6,000/-	6,000/-
b)	Stocking Details		
1	Stocking density @ 20no/sq. mt.	80,000 nos	80,000 nos
2	Cost of seed @0.50 Rs/no	40,000/-	40,000/-
c)	Feed		
1	Total feed required (kg)	2380	3360
2	Cost of feed @80 Rs/kg.	1,90,400/-	Rs. 2,68,800/-
3	Feed conversion ratio	1:1.4	1:1.5
d)	Medicines	10,000/-	10,000/-
e)	Labour Charge	No labour charge	No labour charge
f)	Electricity charges (Rs.)	50,000/-	50,000/-
g)	Harvesting charges @ Rs.5/kg.	8,500/-	8,500/-
h)	Land lease amount for one year (Rs.)	15,000/-	15,000/-
	Total Amount (Rs.)	3,20,900/-	3,99,300/-
i)	Production		
1	Average wt (g) of shrimp at the time of harvesting	25	33
2	Survival (%) and numbers	85 % (68,000 no.)	85 % (68,000 no.)
3	Total production (kg)	1700	2244
C) Income			
1	Average sale price (Rs./kg)	360/-	400/-
2	Total revenue (Rs.)	6,12,000/-	8,97,600/-
D)	Net income Rs. (A+B) – C for First crop and (C-B) for Second crop	-ve 2,23,900/-	4,98,300/-
E)	Net income Rs. after two crops (Second crop – First crop)	2,74,400/-	

F)	Net income Rs. to individual member in first year (6 members)	45,733/-
G)	Assumption of Net income Rs. in second year (considering net income of second crop – 2 crops)	9,96,600/-
H)	Net income Rs. to individual member from second year (6 members)	1,66,100/-

capita income of the state as well as India's per capita income (Anonymous, 2019).

The quality and cost of seed, quantity of feed and culture period were the most pertinent factors for determining the economic viability of shrimp culture. Collected Information indicates the economic progress made by group aqua-group farmers of Raigad, Maharashtra has become a profitable venture for them.

CONCLUSION

Maharashtra is having huge brackish water resources and enormous potential for development of shrimp farming. The main constraint in shrimp farming business is initial huge capital requirement and technical know-how and this can be solved by group aqua-farming. The potential farmers can come together and form groups and start farming activity with the assistance from bank and financial institutions and technical support from College of Fisheries, KVK, Fisheries department and MPEDA. It was also observed that this group aqua-farming has brought a significant improvement in their socio-economic status of group members.

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